

CLAIMS

We claim:

1. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent and a colorant.

2. The ink composition of claim 1, wherein the thermoplastic polyurethane resin and organic solvents form a homogeneous solution and the colorant is soluble in said homogeneous solution or dispersed in said solution.

3. The ink composition of claim 1, wherein the thermoplastic resin is a solution grade isocyanate free thermoplastic polyurethane resin.

4. The ink composition of claim 1, wherein the isocyanate free thermoplastic polyurethane resin has a weight average molecular weight from about 1000 to about 1,000,000.

5. The ink composition of claim 1, wherein the isocyanate free thermoplastic polyurethane resin is present in the ink composition from about 0.1 to about 75 weight percent of the ink.

6. The ink composition of claim 5, wherein the isocyanate free thermoplastic polyurethane resin is present in the ink composition from about 1.0 to about 35 weight percent of the ink.

7. The ink composition of claim 1, wherein the colorant is present in the ink composition in an amount from about 0.1 to about 60 weight percent of the ink composition.

8. The ink composition of claim 1, wherein the colorant is a dye.

9. The ink composition of claim 1, wherein the colorant is a pigment.

10. The ink composition of claim 9, wherein the pigment is selected from the group consisting of organic pigments, inorganic pigments, metallic pigments, phosphorescent pigments, fluorescent pigments, photochromic pigments, thermochromic pigments, iridescent pigments, pearlescent pigments and liquid crystal pigments.

11. The ink composition of claim 1, wherein the organic solvent is selected from the group consisting of alcohols, polyols, polyol ethers, ketones, esters, pyrrolidones, lactones, hydrocarbons and mixtures thereof.

12. The ink composition of claim 1, wherein the organic solvent is from about 1  
5 to about 90 weight percent of the ink composition.

13. The ink composition of claim 12, wherein the organic solvent is from about 10 to about 65 weight percent of the ink composition.

14. The ink composition of claim 1, wherein the ink has a viscosity is less than 500,000 cPs at 20 °C.

10 15. The ink composition of claim 14, wherein the viscosity of the ink is from about 1000 to about 50000 cPs at 20 °C.

Sub A2 16. The ink composition of claim 15, wherein the viscosity of the ink is from about 2000 to about 30,000 cPs at 20 °C.

15 17. The writing instrument of claim 1, wherein the writing instrument is usable on ink-absorbing surfaces.

18. The writing instrument of claim 1, wherein the writing instrument is a ballpoint pen.

Sub A3 19. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent, a colorant and a  
20 second resin.

20. The ink composition of claim 19, wherein the second resin is present in an amount from about 0.1 to about 50 weight percent of the ink composition.

21. The ink composition of claim 20, wherein the second resin is present in an amount from about 0.1 to about 20 weight percent of the ink composition.

25 22. The ink composition of claim 19, wherein the second resin is selected from the group consisting of polyesters, polystyrene, styrene copolymers, acrylonitrile butadiene copolymers, polyisobutylene, polyvinyl chloride, polyvinylidene chloride, polyvinyl acetals, polyvinyl butyrals, polyacrylonitrile, polyacrylates, polymethacrylates, polymethylmethacrylates, polybutadiene, ethylene vinyl acetate, polyamides, polyimides,  
30 polysulfones, polyphenylene sulfide, polyvinyl esters, melamines, vinyl esters, epoxies,  
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polycarbonates, polyether sulfones, polyacetals, polyvinyl butyral, phenolics, polyester carbonate, polyethers, polyethylene terephthalate, polytrimethylene terephthalate, polybutylene terephthalate, polyarylates, polyarylene sulfides, polyketones, polyethylene, high density polyethylene, polypropylene, rosin esters, hydrocarbon resins, copolymers, grafts, blends, and mixtures thereof.

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*Sub A4* ~~23. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent, a colorant and a corrosion inhibitor.~~

24. The ink composition of claim 23, wherein the corrosion inhibitor is present in amounts from about 0.01 to about 10 weight percent of the ink composition.

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25. The ink composition of claim 24, wherein the corrosion inhibitor is present in amounts from about 0.05 to about 2 weight percent of the ink composition.

26. The ink composition of claim 23, wherein the corrosion inhibitor is selected from the group consisting of triazole derivatives and dialkyl naphthalene sulfonate salts.

*Sub A5* ~~27. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent, a colorant and a chemical dispersant.~~

28. The ink composition of claim 27, wherein the chemical dispersant is an oleophilic chemical dispersant, an acid function co-polymer chemical dispersant or soya lecithin.

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*Sub A6* ~~29. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent, a colorant and an antioxidant.~~

30. The ink composition of claim 29, wherein the antioxidant is selected from the group consisting of tocopherols, butylated hydroxy toluene, eugenol and hydroquinone.

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31. The ink composition of claim 29, wherein the antioxidant is present in an amount from about 0.05 to about 30 weight percent of the ink composition.

*Sub A7* ~~32. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent, a colorant and a plasticizer.~~

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33. The ink composition of claim 32, wherein the plasticizer is present in amounts from about 0.1 to about to about 40 weight percent of the ink composition.

34. The ink composition of claim 33, wherein the plasticizer is present in amounts from about 1 to about 20 weight percent of the ink composition.

5            35.     The ink composition of claim 34, wherein the plasticizer is present in  
amounts from about 2 to about 15 weight percent.

36. A non-erasable ink composition for a writing instrument comprising an isocyanate free thermoplastic polyurethane resin, an organic solvent, a colorant and a lubricant.

10            37.     The ink composition of claim 36, wherein the lubricant is sorbitan  
sesquioleate.

38. The ink composition of claim 36, wherein the lubricant is present in an amount from about 0.1 to about 30 weight percent of the ink composition.

39. The ink composition of claim 38, wherein the lubricant is present in an amount from about 1 to about 15 weight percent of the ink composition.

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